Amendments of the Claims

This listing of claims will replace all prior versions and listings of claims in this application:

Listing of Claims

1.   (currently amended) Receiver circuitry for adaptively equalizing a data signal, the receiver circuitry comprising:

equalization implementation circuitry ~~including~~ that includes a selectable number of taps, wherein the equalization implementation circuitry operates on the data signal;

programmable circuitry ~~for allowing~~ that is programmed by configuration data with a first value corresponding to a first number of taps ~~to be specified~~;

processing circuitry ~~for computing~~ that computes a second value corresponding to a second number of taps; and

selection circuitry ~~for selecting~~ that selects, based on a control signal, one of the first and second ~~numbers~~ values as the selectable number of taps at the time the programmable circuitry is being programmed by the configuration data, wherein the selection circuitry ~~is controlled by the programmable circuitry to~~ selects one of the first and second values only once, ~~based on the configuration data,~~ while the equalization implementation circuitry operates on the data signal; and

wherein the selectable number of taps of the equalization implementation circuitry corresponds to the selected one of the first and second values.

2.   (canceled)

3.   (original) The circuitry defined in claim 1 wherein the processing circuitry performs an algorithm to compute the second number.

4.   (previously presented) A digital processing system comprising:

processor circuitry;

a memory coupled to the processor circuitry; and

the receiver circuitry as defined in claim 1 coupled to the processor circuitry and the memory.

5.   (previously presented) A printed circuit board on which is mounted receiver circuitry as defined in claim 1.

6.   (previously presented) The printed circuit board defined in claim 5 further comprising:

a memory mounted on the printed circuit board and coupled to the receiver circuitry.

7.   (previously presented) The printed circuit board defined in claim 5 further comprising:

processor circuitry mounted on the printed circuit board and coupled to the receiver circuitry.

8.   (currently amended) Receiver circuitry for adaptively equalizing a data signal, the receiver circuitry comprising:

equalization implementation circuitry ~~including~~ that includes a filter with taps having a selected one of integer tap spacing and fractional tap spacing relative to the symbol rate of the data signal, wherein the equalization implementation circuitry operates on the data signal;

programmable circuitry that is programmed by configuration data with a first value indicating a first selection between integer spacing and fractional spacing of the taps;

processing circuitry that computes a second value indicating a second selection between integer spacing and fractional spacing of the taps; and

selection circuitry that selects one of the first and second values ~~selections~~ as the selected one of integer spacing and fractional spacing at the time the programmable circuitry is being programmed by the configuration data, wherein the selection circuitry ~~is controlled by the programmable circuitry to~~ selects one of the first and second values only once, ~~based on the configuration data,~~ while the equalization implementation circuitry operates on the data signal; and

wherein the selection between the integer and fractional tap spacing corresponds to the selected one of the first and second values.

9.   (canceled)

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10. (original) The circuitry defined in claim 8 wherein the processing circuitry performs an algorithm to compute the second selection.

11. (original) The circuitry defined in claim 8 wherein the fractional spacing is a selectable fraction of the symbol period, wherein the first selection can include a programmably specified first fraction, and wherein the second selection can include a processing-circuitry-computed second fraction.

12. (currently amended) Receiver circuitry for adaptively equalizing a data signal, the receiver circuitry comprising:

equalization implementation circuitry ~~including~~ that includes at least one selectable coefficient value;

first processing circuitry for computing the coefficient value using a selectable starting value, wherein the coefficient value is different from the starting value;

programmable circuitry that is programmed by configuration data with ~~for allowing~~ a first starting value and outputs the first starting value and a control signal ~~to be specified~~;

second processing circuitry ~~for computing~~ that computes a second starting value and outputs the second starting value in parallel with the first value; and

selection circuitry that:

receives the control signal from the programmable circuitry, the first starting value and the second starting value in parallel;

~~for selecting~~ selects, based on the control signal, one of the first and second starting values ~~as the selectable starting value~~ at the time the programmable circuitry is being programmed by the configuration data, wherein the selection circuitry ~~is controlled by the programmable circuitry to~~ selects one of the first and second starting values only once ~~based on the configuration data~~; and

outputs the selected one of the first and second starting values to the first processing circuitry,

wherein the selectable starting value of the first processing circuitry corresponds to the selected one of the first and second values.

13.   (canceled)

14.   (original) The circuitry defined in claim 12 wherein the first processing circuitry performs an algorithm to compute the coefficient value.

15.   (original) The circuitry defined in claim 12 wherein the second processing circuitry performs an algorithm to compute the second starting value.

16.   (original) The circuitry defined in claim 12 further comprising:

further programmable circuitry for allowing selection between (1) operation of the first processing circuitry to fix on the coefficient value that produces satisfactory equalization, and (2) continued operation of the first processing circuitry to continue to possibly adapt the coefficient value even after satisfactory equalization has been produced.

17-19.   (canceled)

20.   (currently amended) The circuitry defined in claim [[18]] 40 wherein the ~~first~~ second processing circuitry performs an algorithm to compute the first decision directed error signal.

21.   (currently amended) The circuitry defined in claim [[18]] 22 wherein the ~~second~~ first processing circuitry performs an algorithm to compute the second error signal using a training pattern.

22.   (currently amended) Receiver circuitry for adaptively equalizing a received data signal, the receiver circuitry comprising:

first processing circuitry for computing an error signal using a selectable training pattern, wherein the processing circuitry operates on the data signal;

programmable circuitry that is programmed by configuration data with ~~for allowing~~ a first training pattern

~~to be specified~~ and outputs the first training pattern and a first control signal;

training pattern circuitry that computes ~~for providing~~ a second training pattern and outputs the second training pattern in parallel with the first training pattern; and

first selection circuitry that:

receives the first control signal from the programmable circuitry, the first training pattern and the second training pattern in parallel;

~~for selecting~~ selects, based on the first control signal, one of the first and second training patterns ~~as the selectable training pattern~~ at the time the programmable circuitry is being programmed by the configuration data, wherein the first selection circuitry ~~is controlled by the programmable circuitry to select~~ selects one of the first and second training patterns only once ~~based on the configuration data,~~ while the processing circuitry operates on the data signal; and

outputs the selected one of the first and second training patterns to the first processing circuitry.

23. (canceled)

24. (currently amended) Receiver circuitry for adaptively equalizing a data signal, the receiver circuitry comprising:

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equalization implementation circuitry, in the receiver circuitry, having at least one sampling point with a selectable location relative to a bit period of the received signal, wherein the equalization implementation circuitry operates on the data signal;

programmable circuitry ~~for allowing~~ that is programmed by configuration data with a first value corresponding to a first location of the sampling point ~~to be specified~~ and outputs the first value and a control signal;

processing circuitry ~~for computing~~ that computes a second value corresponding to a second location of the sampling point and outputs the second value in parallel with the first value; and

selection circuitry that:

receives the control signal from the programmable circuitry, the first value and the second value in parallel;

~~for selecting~~ selects, based on the control signal, one of the first and second ~~locations~~ values ~~as the selectable location~~ at the time the programmable circuitry is being programmed by the configuration data, wherein the selection circuitry ~~is controlled by the programmable circuitry to~~ selects one of the first and second values only once, ~~based on the configuration data,~~ while the equalization implementation circuitry operates on the data signal; and

outputs the selected one of the first and second values to the equalization implementation circuitry,

wherein the location of the at least one sampling point of the equalization implementation circuitry corresponds to the selected one of the first and second values.

25.   (canceled)

26.   (currently amended) A method of operating receiver circuitry having programmable circuitry and adaptive equalization capability, the method comprising:

programming the programmable circuitry using configuration data with a first value corresponding to a first number of taps;

computing a second value corresponding to a second number of taps;

selecting, at the time the programmable circuitry is being programmed by the configuration data, one of the first and second values a number of taps to be used in equalization implementation circuitry of the device operating on a data signal from one of a programmably specified number of taps and a computed number of taps, wherein the selecting selects one of the first and second values the number of taps only once, based on the configuration data, only once while [[the]] equalization implementation circuitry operates on [[the]] a data signal;

providing the selected one of the first and second values to the equalization implementation circuitry; and

controlling the equalization implementation circuitry to operate with [[the]] a number of taps corresponding to the

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selected one of the first and second values ~~selected in the selecting~~.

27.   (currently amended) A method of operating receiver circuitry having programmable circuitry and ~~adaptive~~ equalization implementation circuitry that includes a filter with taps ~~capability~~, the method comprising:

programming the programmable circuitry using configuration data with a first value indicating a first selection between integer spacing and fractional spacing of the taps;

computing a second value indicating a second selection between integer spacing and fractional spacing of the taps;

selecting, at the time the programmable circuitry is being programmed by the configuration data, based on the received control signal, one of the received first and second values ~~a tap spacing to be used in equalization implementation circuitry of the device operating on a data signal from one of a programmably specified tap spacing and a computed tap spacing~~, wherein the selecting selects one of the received first and second values only once ~~the tap spacing only once, based on the configuration data,~~ while the equalization implementation circuitry operates on [[the]] a data signal;

providing the selected one of the first and second values to the equalization implementation circuitry; and

controlling the filter of the equalization implementation circuitry, in the receiver circuitry, to operate

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with the tap spacing <u>corresponding to the selected one of the</u> <u>first and second values</u> ~~selected in the selecting~~.

28.   (currently amended) A method of operating receiver circuitry having programmable circuitry and adaptive equalization capability, the method comprising:

<u>programming the programmable circuitry using</u> <u>configuration data with a first starting value, wherein the</u> <u>programmable circuitry outputs the first starting value and a</u> <u>control signal;</u>

<u>computing a second starting value;</u>

<u>receiving the control signal, the first starting</u> <u>value and the second starting value in parallel;</u>

selecting, at the time the programmable circuitry is being programmed by <u>the</u> configuration data, <u>based on the</u> <u>received control signal, one of the received first and second</u> <u>starting values</u> ~~a starting value for determination of a~~ ~~coefficient to be used in equalization implementation circuitry~~ ~~of the device operating on a data signal from one of a~~ ~~programmably specified starting value and a computed starting~~ ~~value~~, wherein the selecting selects <u>one of the received first</u> <u>and second values</u> ~~the starting value~~ only once~~, based on the~~ ~~configuration data,~~ while [[the]] equalization implementation circuitry operates on <u>a</u> [[the]] data signal;

~~using~~ <u>processing</u> the <u>selected one of the first and</u> <u>second</u> starting <u>values</u> ~~selected in the selecting~~ to ~~determine~~ compute <u>a</u> ~~the~~ coefficient <u>value</u>~~, wherein a value of the~~ ~~coefficient is~~ different from the selected starting value; and

operating the equalization implementation circuitry<u>,</u> <u>in the receiver circuitry,</u> using the <u>computed</u> coefficient ~~determined in the using~~.

29.   (canceled)

30.   (currently amended) A method of operating receiver circuitry having programmable circuitry and adaptive equalization capability, the method comprising:

<u>programming the programmable circuitry using</u> <u>configuration data with a first training pattern, wherein the</u> <u>programmable circuitry outputs the first training pattern and a</u> <u>first control signals;</u>

<u>computing a second training pattern to output the</u> <u>second training pattern;</u>

<u>receiving the first control signal, the first</u> <u>starting training pattern and the second training pattern in</u> <u>parallel; and</u>

selecting ~~an error signal from~~<u>, based on the first</u> control signal, <u>one of the received first and second training</u> <u>patterns</u> ~~a decision directed error signal and an error signal~~ ~~produced using a training signal~~ at the time the programmable circuitry is being programmed by <u>the</u> configuration data, wherein the selecting selects ~~the error signal only once,~~ <u>one</u> <u>of the first and second the training patterns only once</u>, based on the configuration data, while equalization implementation circuitry operates on a data signal ~~; and~~

~~using the error signal selected in the selecting in a determination of at least one operating parameter of the equalization implementation circuitry of the device~~.

31.   (canceled)

32.   (currently amended) A method of operating receiver circuitry having programmable circuitry and adaptive equalization capability, the method comprising:

programming the programmable circuitry using configuration data with a first value corresponding to a first sampling location, wherein the programmable circuitry outputs the first value and a control signal;

computing a second value corresponding to a second sampling location;

receiving the control signal, the first value and the second value in parallel;

selecting, at the time the programmable circuitry is being programmed by the configuration data, based on the received control signal, one of the received first and second values ~~a sampling location to be used in equalization implementation circuitry of the device operating on a data signal from one of a programmably specified sampling location and a computed sampling location~~, wherein the selecting selects one of the received first and second values only once ~~the sampling location~~ only once~~, based on the configuration data,~~ while [[the]] equalization implementation circuitry operates on the data signal;

<u>providing the selected one of the first and second values to the equalization implementation circuitry;</u> and

<u>operating the equalization implementation circuitry, in the receiver circuitry, using the sampling location corresponding to the selected one of the first and second values</u> ~~selected in the selecting~~.

33. (currently amended) The circuitry defined in claim 1 wherein the programmable circuitry comprises first and second programmable elements, wherein the first programmable element allows the first ~~number of taps~~ <u>value</u> to be specified and the second programmable element controls the selection made by the selection circuitry.

34. (currently amended) The circuitry defined in claim 8 wherein the programmable circuitry comprises first and second programmable elements, wherein the first programmable element allows the first <u>value</u> ~~selection between integer spacing and fractional spacing~~ to be specified and the second programmable element controls the selection made by the selection circuitry.

35. (currently amended) The circuitry defined in claim 12 wherein the programmable circuitry comprises first and second programmable elements, wherein the first programmable element allows the first starting value to be specified and the second programmable element <u>provides the first control signal</u> ~~controls the selection made by the selection circuitry~~.

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36. (currently amended) The circuitry defined in claim 22 wherein the programmable circuitry comprises first and second programmable elements, wherein the first programmable element allows the first training pattern to be specified and the second programmable element <u>provides the first control signal</u> ~~controls the selection made by the selection circuitry~~.

37. (currently amended) The circuitry defined in claim 24 wherein the programmable circuitry comprises first and second programmable elements, wherein the first programmable element allows the ~~first location of the sampling point~~ <u>value</u> to be specified and the second programmable element <u>provides the control signal</u> ~~controls the selection made by the selection circuitry~~.

38. (new) The circuitry defined in claim 1 wherein:
the programmable circuitry outputs the first value and a control signal;
the processing circuitry outputs the second value in parallel with the first value;
the selection circuitry:
receives the control signal from the programmable circuitry, the first value and the second value in parallel;
selects, based on the received control signal, one of the first and second values; and

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outputs the selected one of the first and second values to the equalization implementation circuitry.

39. (new) The circuitry defined in claim 8 wherein:

the programmable circuitry outputs the first value and a control signal;

the processing circuitry outputs the second value in parallel with the first value; and

the selection circuitry:

receives the control signal from the programmable circuitry, the first value and the second value in parallel;

selects, based on the control signal, one of the first and second values; and

outputs the selected one of the first and second values to the equalization implementation circuitry.

40. (new) The circuitry defined in claim 22 further comprising:

equalization implementation circuitry responsive to an error signal, wherein the equalization implementation circuitry operates on the data signal;

wherein the first processing circuitry receives the selected one of the first and second training patterns and computes a first error signal using the selected training pattern and outputs the first error signal;

second processing circuitry that computes a second decision directed error signal using a training pattern and

outputs the second error signal in parallel with the first error signal; and

second selection circuitry that:

receives a second control signal from the programmable circuitry, the first error signal and the second error signal in parallel;

selects, based on the second control signal, one of the first and second error signals; and

outputs the selected one of the first and second error signals to the equalization implementation circuitry,

wherein the equalization implementation circuitry is responsive to the selected one of the first and second error signals.

41.   (new) The method of claim 26 wherein:

the programmable circuitry outputs the first value and a control signal; and

the control signal, the first value and the second value are received in parallel.

42.   (new) The method of claim 27 wherein:

the programmable circuitry outputs the first value and a control signal; and

the control signal, the first value and the second value are received in parallel.

43.   (new) The method of claim 28 further comprising:

selecting, at the time the programmable circuitry is being programmed by the configuration data, whether the computed coefficient to be used in equalization implementation circuitry is to be determined once or on an on-going basis; and

determining the computed coefficient in accordance with the selecting.

44.   (new) The method of claim 30 further comprising:

computing a first error signal based on the selected training pattern;

computing a second decision directed error signal based on a training pattern;

receiving the second control signal, the first error signal and the second error signal in parallel;

selecting, based on a second control signal provided by the programmable circuitry, one of the received first and second error signals; and

using the selected one of the first and second error signals in a determination of at least one operating parameter of the equalization implementation circuitry.